

late Tay Bridge may be interesting. I suppose that equal trains are upon the two bridges; and I assume that the force of the wind on the Tay Bridge train tore one pier from its foundation-attachment. (I imagine that the ruin of the bridge commenced thus). The height of the centre of the Tay Bridge train was about 92 feet, and the momentum of the wind was, therefore, wind \times train \times 92 feet. (The reader will easily interpret my brief notation). To resist this there were three pairs of attachments to the foundation, with lever-widths of 10 feet, 22 feet, 10 feet, respectively. So that, supposing the holding powers of each attachment the same, we must have had for momentum of resistance, one Tay-attachment \times (10 + 22 + 10) feet. At the instant of breakage, this was equal to the momentum of the wind, or to wind \times train \times 92 feet. So that one Tay-attachment = $\frac{92}{42} \times$ wind \times train = $2.19 \times$ wind \times train. If

we treat the proposed Forth Bridge in the same manner, we must use, length of lever about 660 feet, and two pairs of attachments of the cantilever to the pier (if I read the plan correctly), at distances of 30 and 120 feet. And thus we shall have the equation at a moment of breakage.

One Forth-attachment \times (30 + 120) = wind \times train \times 660; or one Forth-attachment must = $4.4 \times$ wind \times train, or double that required for the Tay Bridge.

A numerical value (possibly subject to modification) may be given thus:—Suppose the surface of a train to = 3000 square feet. With the Government scale of 56 lbs. for high wind, the lateral pressure = 75 tons; and, using leverage numbers as above, one Forth-attachment = 330 tons. And this is the strain which each attachment must be able to sustain in respect of resistance to the effect of wind upon a train. I imagine that this has been provided, at least in great measure; but I think it desirable that attention should be called to the magnitude of the forces here concerned.

The able and experienced engineer who has undertaken the prosecution of this great work, will, I am confident, recognise the possibility of serious inconvenience (yet unforeseen) arising from the points to which I have alluded in NATURE, vol. xxvi. p. 599—the novelty of plan, at least in this country—the magnitude of plan—the want of experience in a rising scale of magnitude. Should the bridge be erected successfully, I can imagine that many difficulties on small points might arise. For instance:—all matter yields to force; the brackets of furlong-length, could not strictly preserve their form under the passage of a train; the connection of the end of one bracket with the beginning of the next is not very perfect, and I can hardly imagine that trains could be run through at speed (which, as I understood, is one of the conditions to be secured).

I still prefer the principle of suspension. I would propose for further consideration the modifications which I have suggested in NATURE, vol. xxvi. p. 600, for giving enlarged width with diminished height to the top of the piers, and for use of wire in forming the suspension-chains.

G. B. AIRY

The White House, Greenwich, December 4

NOTES

MONDAY's sitting of the Paris Academy of Sciences was one of unusual interest. M. Jamin, who was in the chair, delivered an eloquent address on the services rendered to science and to the Academy by M. Dumas, and presented to the illustrious perpetual Secretary the medal subscribed for by his admirers as a testimonial on the occasion of the fiftieth year of his nomination as an academician. The medal is accompanied by silver and bronze replicas. The whole of the audience, which was very numerous, broke into enthusiastic plaudits. When the enthu-

siasm subsided, M. Dumas returned thanks, which he did with masterly eloquence.

WE regret to announce the death of the Rev. James Challis, M.A., F.R.S., Plumian Professor of Astronomy and Fellow of Trinity College, which took place on Sunday morning at his residence in Cambridge, after a long illness. The late Professor was born in 1803, and educated at Trinity College, where he graduated B.A. in 1825 as Senior Wrangler and first Smith's prizeman. In 1836 he was elected Plumian Professor of Astronomy in succession to Mr. (now Sir) G. B. Airy, and also held the important post of Director of the Cambridge Observatory. The latter post he resigned in 1861, and was succeeded by Prof. Adams. He was at the time of his death the Senior of the Professors at Cambridge, and until about two years ago personally discharged the duties of his professorship, when increasing age and infirmities compelled him to appoint a deputy. Prof. Challis has published a considerable number of scientific works, including twelve volumes of astronomical observations.

THE death is announced of Dr. Gustave Svanberg, formerly Professor of Astronomy and Director of the Observatory of Upsala University. He died on November 21, in his eighty-first year.

NEWS from Aden reports the death of Marchese Orazio Antinori, the well-known zoologist and African traveller, who had recently started on a new expedition to the Upper Nile. He was seventy-one years of age.

ELABORATE preparations were made in various parts of America to observe the transit of Venus yesterday. The Western Union Telegraph, to facilitate observations, arranged to transmit Washington time wherever desired, in order to secure accuracy in recording results. Some enthusiastic astronomers had proposed general prayer in the churches on Sunday last for clear weather.

M. W. DE FONVIELLE has published the first number of a new astronomical journal, called "Les Passages de Venus," which explains the great astronomical event, and is being sold in the streets of Paris at 1 sou, with illustrations indicating the phase, and giving instructions for their observation in France. The editor states that he trusts that the second number will appear at the right date, June 8, 2004, and the third in June, 2012, and so on, as long as there will be on the earth rational beings intelligent enough to take an interest in the transit of Venus. He congratulates himself on having established a "periodical" which will be perhaps the most durable foundation of his age.

A SWISS Geological Society has lately been formed. It is an offshoot from the Helvetic Society of Natural Sciences. While a permanent section of this, it will have its own life, its committee, its funds, its distinct *séances*, and its publications if thought desirable. It will have members who do not belong to the mother society; will send a delegate to the preparatory assembly of the latter, and will have the right of presentation of members. The number of adherents of the new society is already over sixty. It has absorbed the *Congress der Feld Geologen* and the *Comité d'Unification géologique*. Among other things it will encourage excursions along with discussion on the ground, and will represent Switzerland in the International Geological Congresses. The Society has testified its respect for MM. Stüden, Heer, and Merian, by (exceptionally) giving them the title of Honorary Members.

THE Council of the British Association, acting under the powers conferred upon them by the General Committee, in accordance with their Report, have appointed the following to be a Committee, "to draw up suggestions upon methods of more

systematic observations, and plans of operation for local societies, together with a more uniform mode of publication of the results of their work," and to "draw up a list of local societies which publish their proceedings," Mr. H. G. Fordham (Secretary), Rev. Dr. Crosskey, Mr. C. E. De Rance, Sir Walter Elliot, Mr. Francis Galton, Mr. John Hopkinson, Mr. R. Meldola, Mr. A. Ramsay, Prof. W. J. Sollas, Mr. G. J. Symons, Mr. W. Whitaker.

COLONEL PREJEVALSKY, the distinguished traveller, intends to resume his explorations in Central Asia in the spring, and to make another attempt to penetrate to the capital of Thibet. He is now suffering slightly from weakness of sight.

PROFESSORS have been appointed to give courses of lectures at the Louvre upon its collections, and the school opens this week. Gaulish antiquities will be expounded by M. Bertrand, curator of St. Germain Museum; Egyptian remains by MM. Pierret and Revillout; Semitic epigraphy and archaeology by M. Ledrain; and ancient art by M. Ravaisson.

A "PROJET de Mer Intérieure dans le sud de l'Algérie et de la Tunisie" (occupying the space usually known as "The Schots" or "Les Chotts," which is lower by several feet than the Mediterranean Sea), suggested by M. le Commandant Roudaire, was communicated some time since to the French Government, and was in May last laid by M. de Freycinet before a "Commission Supérieure." This Commission has examined the question under every point of view, antiquarian, political, practical, and commercial, and their labours are recorded in a quarto volume of 546 pages, illustrated by a map. On July 7, 1882, the Commission made the following Report:—

"La Commission,

Considérant que les dépenses de l'établissement de la mer intérieure seraient hors de proportion avec les résultats qu'on peut en espérer,

Est d'avis qu'il n'y a pas lieu pour le Gouvernement Français d'encourager cette entreprise."

In the course of the coming winter Prof. Emil Selenka hopes to publish a Monograph of the Sipunculacea, in which he will be assisted by Doctors J. G. de Man and C. Bülow. The volume will contain the descriptions of 81 distinct species placed in 10 genera. Some of the species are new. The Monograph will form vol. iv. of Semper's "Reisen im Archipel der Philippinen," and will contain the forms collected by Semper; but in order to make it a more or less complete revision of the group, Dr. Selenka also describes in it the species collected at the Mauritius by Dr. Möbius, those in the Berlin Museum through the goodness of Prof. Peters (this collection contains the types of Grube), those from Stuttgart containing Dr. Klunzinger's Red Sea collection (through Dr. Krauss), those from the British Museum (through Dr. Günther), and those from Göttingen, the types of Keferstein (through Dr. Ehlers). In addition, Dr. Selenka has been indebted for specimens to the liberality of Dr. von Martens, Dr. Hilgendorff, Dr. Krapelin, and Dr. Lang. Dr. Grœffe was able to forward living examples of *Aspidosiphon mülleri*. Besides a general introduction and description of the genera and species, there will be dissertations on the tenacular and blood systems, while special care has been taken about the subjects of the geographical distribution, anatomical relations, and synonymy of the species. The volume will be accompanied by 15 plates with more than 200 partly coloured drawings.

SINCE the commencement of the present Session the Society of Arts meeting room has been lighted by means of electricity. A Siemens dynamo is employed driven by an 8 horse-power Crossley gas engine. Nearly the whole cost of these was defrayed by subscriptions from a few past and present members of the Society's Council. The lamps used are those of Edison,

and there are at present fifty of them in the room. The chandeliers now in use have been lent by Messrs. Verity, who are constructing chandeliers to be permanently fitted, now that the number of lights to be used has been decided upon. Temporary fittings have been put up in the council room, and the result having been proved satisfactory, it is in contemplation to arrange for the lighting by electricity of this and other parts of the building.

AN unusually large number of seals have made their appearance in the Baltic, a few miles north of the Samland coast. Should these animals make that spot their permanent residence, the salmon fisheries would be in a sad plight. On the Pomeranian coast the damage to salmon fisheries done by seals is very considerable.

No less than thirty-four communes in the district of Chambéry (Savoie) are now infected by Phylloxera.

A COMMISSION has been appointed by the Prefect of the Seine to reconsider the disposal of the Paris sewage. A deputation will be sent, at the expense of the Municipal Council, to Brussels, Antwerp, Amsterdam, Berlin, and London to report on the matter.

A BRUSSELS paper, *L'Athenaeum Belge*, reports some interesting observations made by M. W. Spring regarding the seat and origin of thunderstorms. During the summer 1881 M. Spring ascended the Schnœhorn in the Bernese Oberland during a thunderstorm. He then noticed that for a considerable time no rain fell, but that a vivid formation of hail took place. From time to time the hail fell very much thicker, and in such moments came a bright flash of lightning followed by a tremendous clap of thunder. After a pause rain-drops mixed with the hail. The same observations were made on the summit of S. Giacomo, where he again observed a thunderstorm. He concludes from his observations that the actual seat of thunderstorms, *i.e.* of the aerial electricity is not in moist regions of the atmosphere but in the dry and cold region of hail.

PROF. HEULE, the eminent anatomist, has been elected, in the place of the late Prof. Wöhler, as permanent secretary of the Royal Academy of Sciences at Göttingen.

NEWS from Champagne states that a new enemy to the vine has made his appearance in the shape of a minute fungus, a kind of *Peronospora*, the dangers of which are said to be far more serious even than those of Phylloxera.

DR. C. W. SIEMENS, F.R.S., has consented to distribute the prizes and certificates gained by the successful candidates of the metropolitan centres at the recent technological examinations, as well as by the students of the City and Guilds of London Technical College, Finsbury, and of the City and Guilds of London Technical Art School, Kennington. The distribution will take place on Thursday evening, December 14, at 7 o'clock, at Goldsmiths' Hall, Foster Lane, E.C.

TELEGRAMS from General Nansouty to Admiral Mouchez announce that an avalanche of fresh fallen snow had swept away five labourers who were trying to carry victuals to the Pic du Midi for MM. Henry, who are at that place to observe the transit of Venus. Two of these poor people lost their lives.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus radiatus*) from India, presented by Mr. W. Nash; a Capybara (*Hydrochaeris capybara*) from Venezuela, presented by Mrs. R. H. Fitz-Simons; a European Scops Owl (*Scops giu*), European, deposited.